

REMARKS

Applicant appreciates the Examiner's thorough examination of the present application as evidenced by the Office Action of February 24, 2004 (hereinafter "Office Action"). In response, Applicant has amended Claim 1 to clarify that the first metal oxide layer is selectively formed substantially only on the first surface portion, *i.e.*, exposed portion, of the insulation layer without substantially forming the metal oxide layer on the upper and lower conductive layers. Applicant respectfully submits that the cited references fail to disclose or suggest at least the recitations of independent Claim 1 as amended. Therefore, Applicant respectfully submits that all pending claims are in condition for allowance. Favorable reconsideration of all pending claims is respectfully requested for at least the reasons discussed hereafter.

Claim 1 Satisfies the Requirements of 35 U.S.C. §112

Claims 1 and 3 - 13 stand rejected under 35 U.S.C. §112, ¶2, as being indefinite. Applicant respectfully submit that by way of the above amendments and accompanying remarks, the claims now particularly point out and distinctly claim the subject matter that Applicant regards as his invention.

The Office Action asserts that the recitation "substantially only" is unclear. In response, Applicant has amended Claim 1 to clarify that the metal oxide layer is formed substantially only on the first, exposed, surface portion of the insulation layer without substantially forming the metal oxide on the upper and lower conductive layers. Accordingly, Applicant maintains that Claims 1 and 3 - 13 now comply with 35 U.S.C. §112 and respectfully request that the §112 objection be withdrawn.

Independent Claim 1 is Patentable

Independent Claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Korean Patent Publication No. 2000-25706 (hereinafter "25706 Publication" in view of U. S. Patent No. 6,203,613 to Gates *et al.* (hereinafter "Gates")).

Claim 1, as amended, recites:

forming an insulation layer that comprises oxygen between upper and lower conductive layers, the insulation layer having a first surface portion that is exposed by the upper and lower conductive layers and a second, non-exposed, surface portion at an interface with the upper conductive layer; and

exposing the insulation layer to a metal precursor that is reactive with oxygen so as to selectively form a first metal oxide layer on substantially only the first surface portion of the insulation layer without forming the first metal oxide layer on the second surface portion of the insulation layer and without substantially forming the first metal oxide layer on the upper and lower conductive layers, such that the first metal oxide layer and the second surface portion of the insulation layer do not overlap,

wherein exposing the insulation layer to the metal precursor comprises: pulsing the metal precursor over the integrated circuit device; and exposing the integrated circuit device to an inert gas.

(Emphasis added).

Thus, according to independent Claim 1, the metal oxide layer is formed on the first surface, *i.e.*, exposed portion of the insulation layer without substantially forming the metal oxide layer on the upper and lower conductive layers. Moreover, the first metal oxide layer is formed on the insulation layer through atomic layer deposition involving pulsing the metal precursor over the integrated circuit device and exposing the integrated circuit device to an inert gas.

In sharp contrast, the metal oxide layer **22** shown in the 25706 Publication has portions thereof disposed on the upper electrode layer **16**, the lower electrode layer **12**, and the planarized layer **10**. The 25706 Publication Abstract suggests that the metal oxide layer **22** may be formed by a reactive sputtering deposition process, rather than an atomic layer deposition process involving pulsing the metal precursor over the integrated circuit device and exposing the integrated circuit to an inert gas as recited in Claim 1.

In addition, the metal oxide layer **22** has portions thereof disposed on an upper surface of the upper electrode **16** that, in contrast with the recitations of Claim 1, overlap a non-exposed portion of the insulating layer **14** at an interface with the upper electrode **16**. The Office Action asserts that the metal oxide layer **22** does not overlap the unexposed portion of the insulation layer **14**. (Office Action, pages 2 and 9).

Applicant respectfully submits that even though the upper electrode layer **16** is disposed between the metal oxide layer **22** and the insulating layer **14**, the metal oxide layer **22** still "extends over or past and cover[s] a part of" the insulating layer **14**, which is consistent with the definition of the term "overlap." In other words, Applicant submits that one layer can still cover another layer even if a third layer is disposed therebetween. Applicant further submits that Gates fails to provide the teachings missing from the 25706 Publication as discussed above.

In response to the assertion in the Office Action that **FIG. 2** of the assertion in the Office Action that there is overlap between the metal oxide layer **200** and the second surface portion of the insulation layer **110**, Applicant respectfully submits that this is an incorrect interpretation of the language of Claim 1 and **FIG. 2**. Claim 1 describes the second surface portion of the insulation layer as follows:

a second, non-exposed, surface portion at an interface with the upper conductive layer...

Thus, the second, non-exposed, surface portion of the insulation layer *is at an interface with the upper conductive layer*. Applicant respectfully submits that there is no non-exposed surface portion of the insulation layer **110** at the interface with the upper conductive layer **120** that overlaps with the metal oxide layer **200**.

For at least the foregoing reasons, Applicant respectfully submits that independent Claim 1 is patentable over the 25706 Publication and Gates, and that dependent Claims 3 - 13 are patentable for at least the reason that they depend from an allowable claim.

In re: Hag-ju Cho
Serial No.: 09/893,035
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Page 8 of 8

CONCLUSION

In light of the above amendments and remarks, Applicant respectfully submits that the above-entitled application is now in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

It is not believed that an extension of time and/or additional fee(s)-including fees for net addition of claims-are required, beyond those that may otherwise be provided for in documents accompanying this paper. In the event, however, that an extension of time is necessary to allow consideration of this paper, such an extension is hereby petitioned under 37 C.F.R. §1.136(a). Any additional fees believed to be due in connection with this paper may be charged to our Deposit Account No. 50-0220.

Respectfully submitted,



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